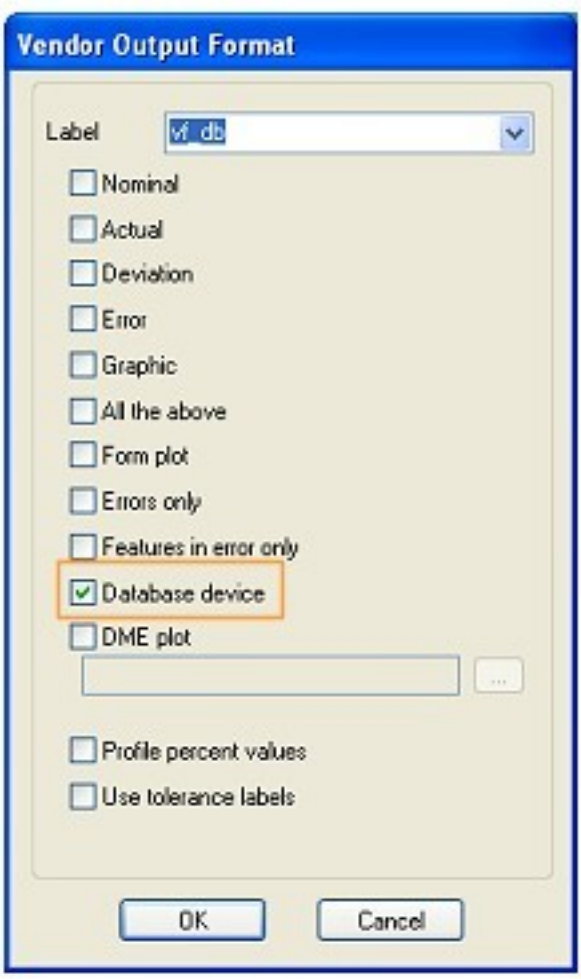
Tutorial

H-1000-5338-01-A

Dynamic database management



RENISHAW apply innovation™

MODUS

Disclaimer

Considerable effort has been made to ensure that the contents of this document are free from inaccuracies and omissions. However, Renishaw makes no warranties with respect to the contents of this document and specifically disclaims any implied warranties. Renishaw reserves the right to make changes to this document and to the product described herein without obligation to notify any person of such changes.

Trademarks

All brand names and product names used in this document are trade names, service marks, trademarks, or registered trademarks of their respective owners.

Renishaw part no: H-1000-5338-01-A

Issued: 12 2013

Dynamic database management

Care of equipment

Renishaw probes and associated systems are precision tools used for obtaining precise measurements and must therefore be treated with care.

Changes to Renishaw products

Renishaw reserves the right to improve, change or modify its hardware or software without incurring any obligations to make changes to Renishaw equipment previously sold.

Warranty

Renishaw plc warrants its equipment for a limited period (as set out in our Standard Terms and Conditions of Sale) provided that it is installed exactly as defined in associated Renishaw documentation.

Prior consent must be obtained from Renishaw if non-Renishaw equipment (e.g. interfaces and/or cabling) is to be used or substituted. Failure to comply with this will invalidate the Renishaw warranty.

Claims under warranty must be made from authorised service centres only, which may be advised by the supplier or distributor.

Trademarks

Windows 98, Windows XP, Windows 2000 and Windows NT are registered tradenames of the Microsoft Corporation.

IBM is the tradename of the International Business

Machines Inc All trademarks and tradenames are

acknowledged.

Contents

1 Dynamic database management

1.1 Tutorial pre-requisites

- The student should understand the contents of the basic tutorials
- The student should have completed the ‘Introduction to high level programming’ and ‘Alternative user defined outputs’ tutorials

1.2 Tutorial objectives

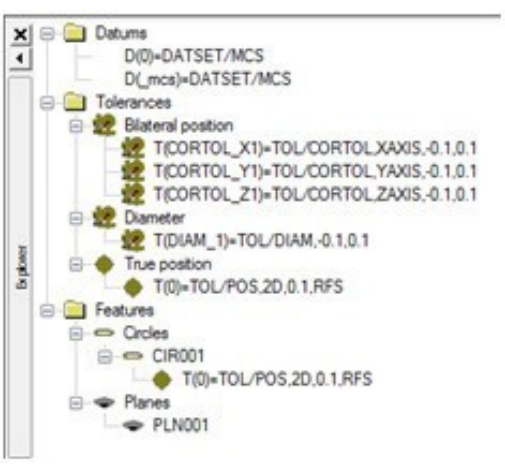
- Introduction to automated methods of processing and archiving measurement data so that it is available for future analysis and reporting
- Further exposure to automated file management from within a measurement program

2 Introduction

MODUS creates a great deal of information in order to archive and re-use data later. Data is saved in both text and database format. Text data, which includes data with an RES and RTF file extension, can be easily viewed in a simple report format.

```
-------------------------------------------------------------------------------
14-Mar-2013 08:50              Start Template                          Page  1
-------------------------------------------------------------------------------
(mm)          ACTUAL   NOMINAL    LO-TOL    HI-TOL DEVIATION GRAPHIC       ERROR
-------------------------------------------------------------------------------
Point:PNT001
Point-Profile -0.098             -0.150    +0.150    -0.098 -*-+---
-------------------------------------------------------------------------------
Point:PNT002
Point-Profile  0.089             -0.150    +0.150     0.089 ---+-*-
-------------------------------------------------------------------------------
Point:PNT003
Point-Profile -0.092             -0.150    +0.150    -0.092 -*-+---
-------------------------------------------------------------------------------
Point:PNT004
Point-Profile -0.016             -0.150    +0.150    -0.016 ---*---
-------------------------------------------------------------------------------
Point:PNT005
Point-Profile -0.052             -0.150    +0.150    -0.052 --*+---
-------------------------------------------------------------------------------
Circle:CIR001
X-axis        52.574    52.500                       0.074
Y-axis        -9.453    -9.500                       0.047
TruePosition2D 0.175                        0.100             +-->       0.075
-------------------------------------------------------------------------------
Circle:CIR002
X-axis       -48.505   -48.500                      -0.005
Y-axis        34.493    34.500                      -0.007
TruePosition2D 0.016                        0.100             *---
-------------------------------------------------------------------------------
Circle:CIR001
X-axis        52.574    52.500                       0.074
Y-axis        -9.453    -9.500                       0.047
TruePosition2D 0.175                        0.100             +-->       0.075
TruePosition3D 0.175                        0.100             +-->       0.075
-------------------------------------------------------------------------------
```

The database is a more organised format of the data and is generated each time the program runs. A database contains feature data, point data and other information that can be used in a program to re-generate a report. The data that is listed in the ‘Explorer’ window shows the information from the database.



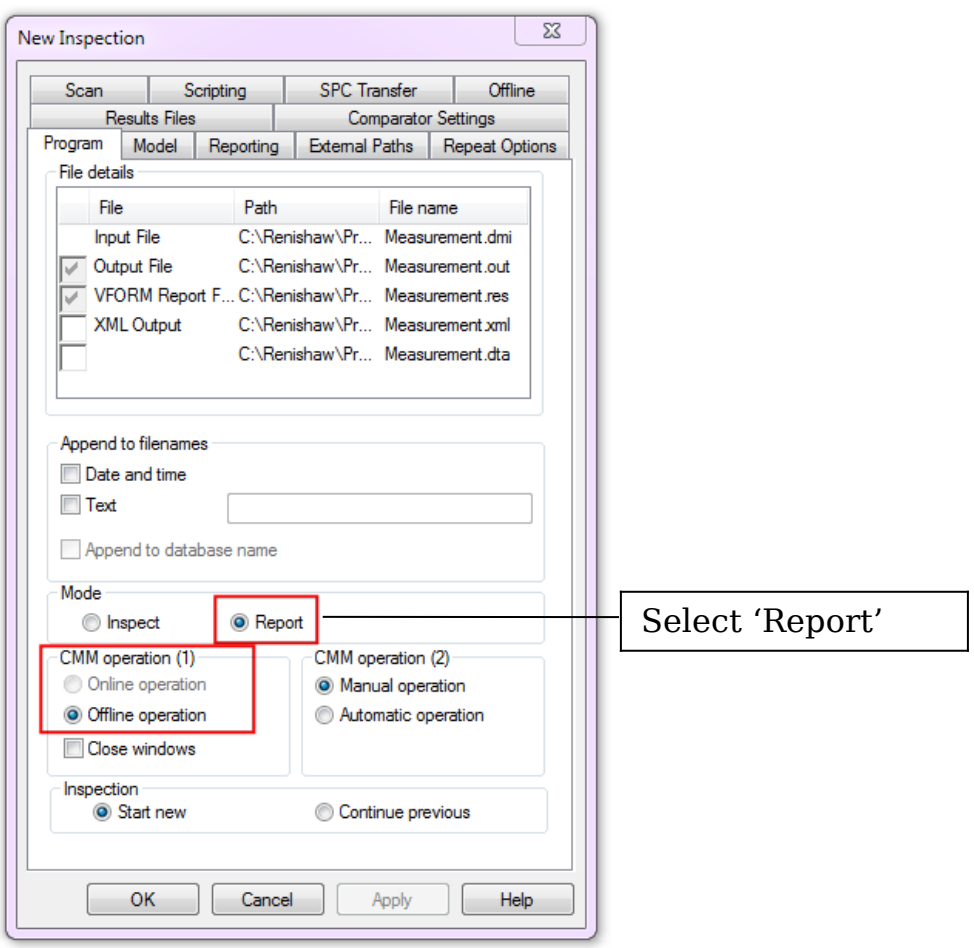
One way that the database is useful is that it allows the program to be run at a later time, using the initial data from a previous part run. When this is done, the data can be used for constructions, or re-output. This is useful if the data must be output with new tolerance data for example.

3 Re-running a program using Report Mode

3.1 Using the database from the last measurement

Create a measurement program that measures some features on the training block and outputs the results (eg. the 8x 7mm diameter holes that lie on the top counter-bored face of the Renishaw demo block and output them for position and diameter). Make a copy of the resultant .res file for reference use later.

To re-run the program using an existing database, browse to and open the program. In the 'New Inspection' dialogue, select the 'Report' radio button in the 'Mode' section, you will notice that MODUS automatically switches the 'CMM operation (1)' to 'Offline operation'.



MODUS will now run the program in offline mode but it will use the **actual** touchpoint data from the database, this can be checked by comparing the results to the previously copied .res file from earlier. The program can now be amended or added to if further analysis is required ie. add a roundness tolerance to all 8 holes.

This method will **only** use the database from the last run of the program – every time the program is opened for measurement it will overwrite the database.

3.2 Using a uniquely identified database

To create unique databases for later use, MODUS must append some further information to the database name, the format can be either date and time and/or free text.

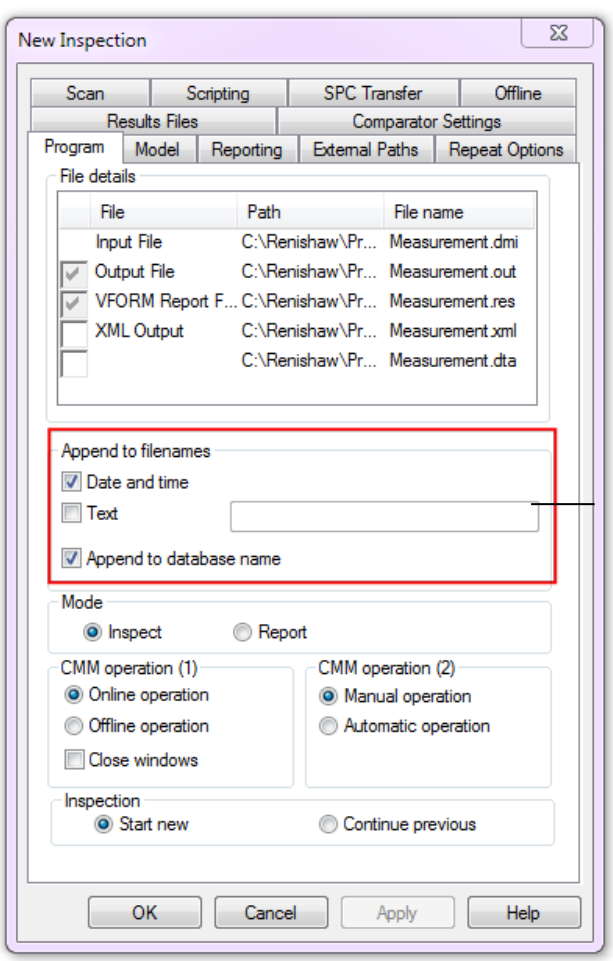
Start a new measurement program and select the ‘Date and time’ checkbox and the ‘Append to database name’ checkbox.

The Date and time are added to the .out, .res and .rtf file names and optionally to the inspection database in the format:

_yearmonthday_hourminutesecond

For example, if the program is executed on 29 December 2013 at 11:06 and 32 seconds, _20131229_110632 is appended to the filenames.

‘Text’ is a user input option (eg. serial number or other unique identifier). If the program is ran at a later date with **just** the ‘Text’ option selected and the text is the same as a previously ran program (ie. a repeated serial number is input) then the existing database will be overwritten. It is best practice to append ‘Date and time’ to avoid this scenario.



Options include appending to results file only or results file

GUIDANCE NOTE: The text cannot include the characters \ / : * ? “ < > | ; as these are not valid in a Microsoft® Windows filename.

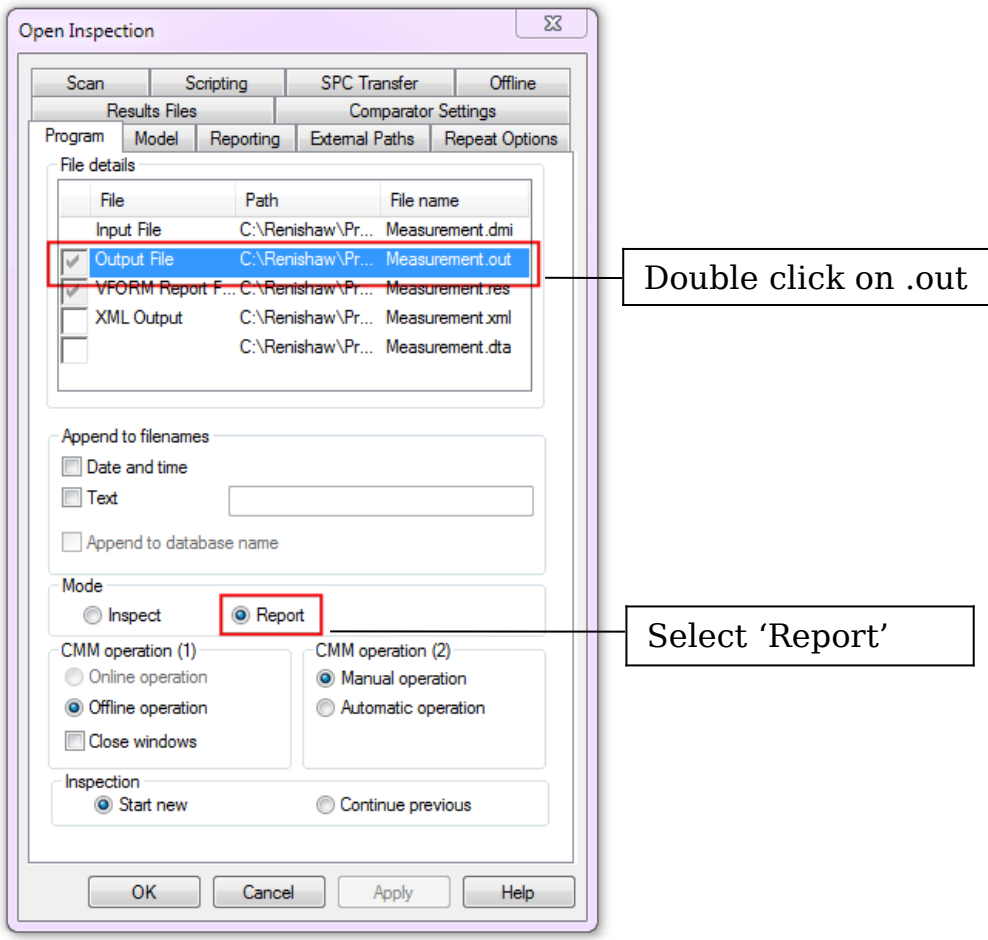
Now open the hole measurement program created in the previous chapter 3.1, ensuring ‘Mode: Inspect’ and ‘CMM operation (1): Online operation (or Offline operation if working in offline mode)’ are selected. In the ‘Append to filenames’ area select ‘Date and time’ checkbox and ‘Append to database name’ checkbox.

Now run the program 3 times ensuring the ‘ENDFIL’ is reached each time.

This will create 3 individual timestamped .res, .rtf and .out files in the same location as the program .dmi file:-

It will also create 3 individual timestamped SQL databases, the SQL database Administrator is covered in Chapter 4 of this document.

To re-run the program using an existing database with a pre-defined appended timestamp or text, browse to and open the program. In the ‘New Inspection’ dialogue, select the ‘Report’ radio button in the ‘Mode’ section, ensure the ‘Append to filenames’ radio buttons are **unchecked**, but this time double click on the .out file path in the ‘File details’ area:-



This will open a 'Browse Output' dialogue box, select the .out file with relevant appended timestamp or text (eg. choose the earliest timestamp, in the above example 'Measurement_20160113_095716.out' is the earliest previous run).

Now run the program, this will use the actual touch data from the timestamped SQL database, again this can be checked by comparing the newly created .res file with the timestamped .res file.

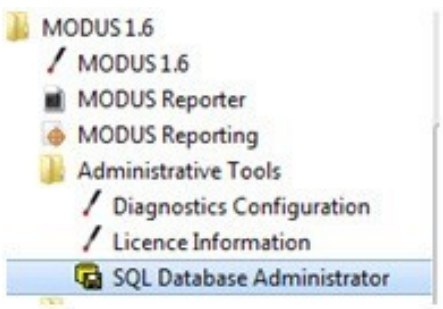
GUIDANCE NOTE: Programs ran in 'Report' mode can be amended/modified for further analysis with regards to new tolerances, newly constructed features, datum manipulation etc.

4 Backing up and restoring local inspection databases

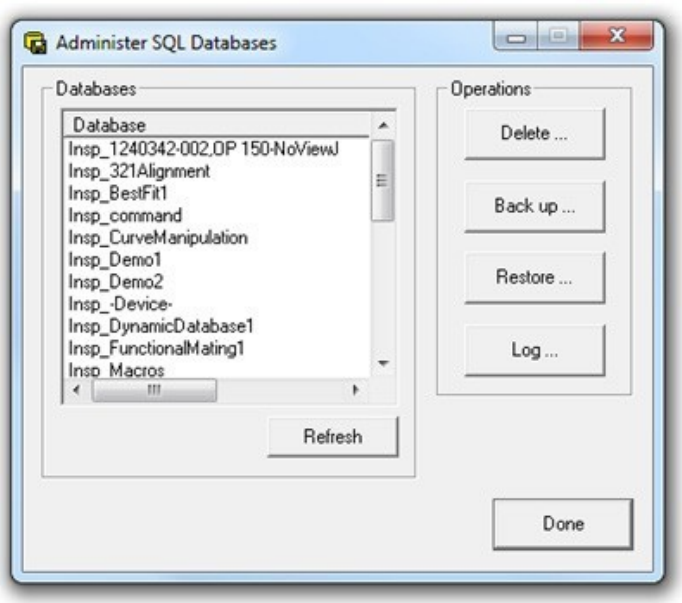
4.1 Backing up a database

Databases can only be backed up in the SQL database administrator either for archiving purposes or to transfer the database to another computer.

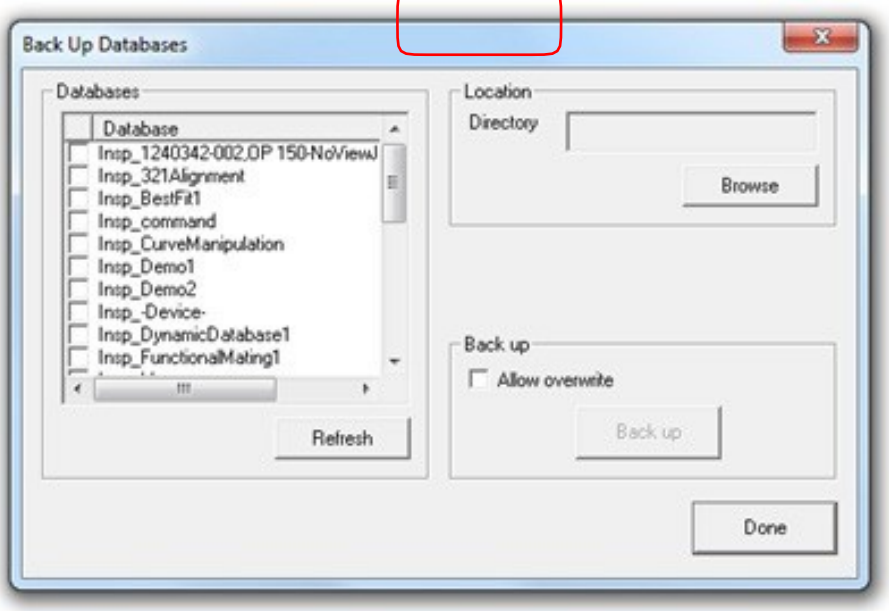
To back up a database, go to the Windows ‘Start’ menu, ‘All Programs’ browse to ‘Modus 1.x’ and select the ‘SQL Database Administrator’ from the ‘Administrative Tools’ menu item.



Select ‘Back up’, which will open the backup dialogue.



Select the files to backup and the location to save them (this must be a local drive). Also, choose whether to allow the files to be overwritten. Finally, click the ‘Back up’ button to save the backups.

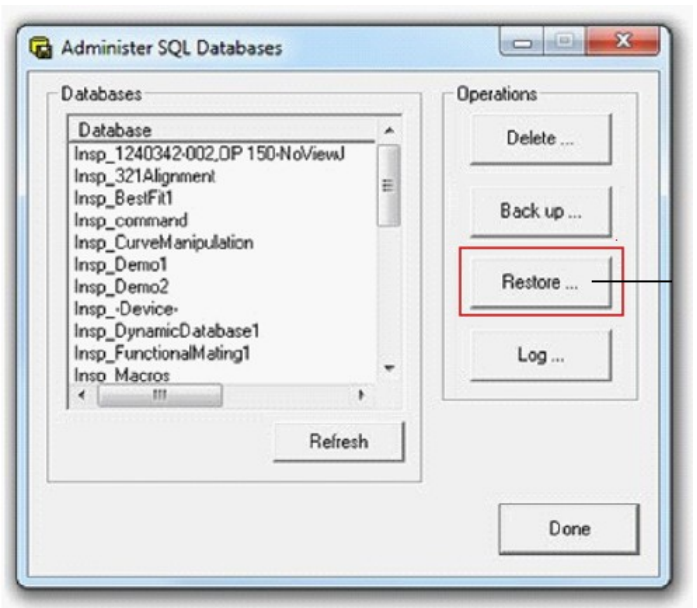


This action will create 2 files, one will be a file named ‘Insp_program_name.bak’ (this contains the database specific information) the other will be a folder with the same name as the program (this contains the raw touch point data).

4.2 Restoring a database

To restore a database into SQL, first ensure that the two files (.bak and touchpoint folder) reside in a local folder on the PC.

In SQL Database Administrator select the ‘Restore’ button, browse to the relevant folder and select the .bak file, select the ‘Allow overwrite’ checkbox if required and press the ‘Restore’ button:-



The database will now be available for use in Modus using ‘Report’ mode or Modus Reporter for creating reports.

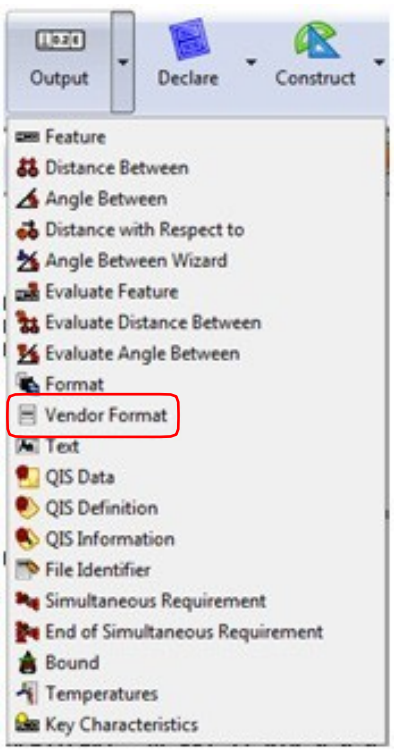
GUIDANCE NOTE: An alternative method for restoring a SQL database is to use Modus Reporter software and select the ‘add (+)’ symbol in the database area. The Advanced Modus Reporter tutorial is covered during the Modus Advanced training course.

5 Saving dynamic databases

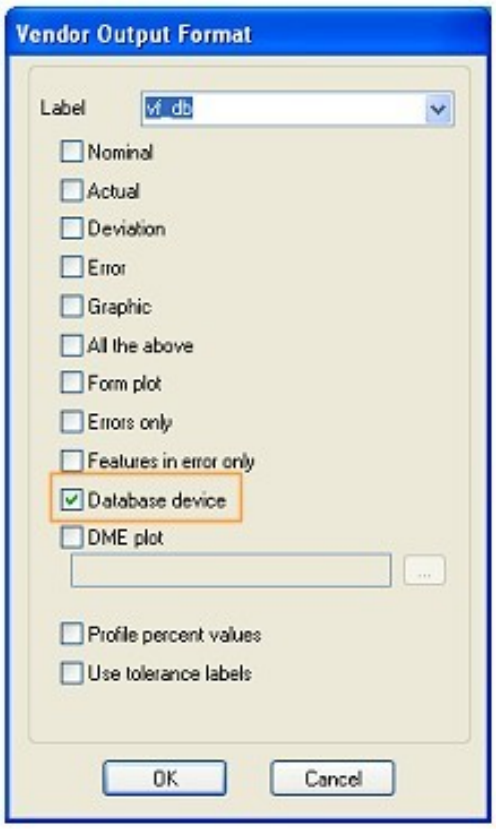
Databases can also be saved and archived automatically each time a program is run from within the MODUS dmis program. Creating a dynamic inspection database is accomplished by using a device.

Begin by double clicking on the VFORM command line or add a new ‘Vendor Format’ from the MODUS ‘Output’ menu.

```
000001  DMISMN/'Start Template',05.2
000002  FILNAM/'Start Template',05.2
000003  DU(0)=DMESWU/'16,0,1,90'
000004  UNITS/MM,ANGDEC
000005  DECPL/ALL,DEFALT
000006  U(0)=UFORM/ALL,PLOT
000007  DISPLY/TERM,U(0),STOR,DMIS,U(0)
000008  SNSET/APPRCH,5
000009  SNSET/CLRSRF,15
000010  SNSET/DEPTH,0
000011  D(0)=DATSET/MCS
000012  MODE/MAN
000013  T(CORTOL_X1)=TOL/CORTOL,XAXIS,-0.1,0.1
000014  T(CORTOL_Y1)=TOL/CORTOL,YAXIS,-0.1,0.1
000015  T(CORTOL_Z1)=TOL/CORTOL,ZAXIS,-0.1,0.1
000016  T(DIAM_1)=TOL/DIAM,-0.1,0.1
000017  PAUSE
000018  ENDFIL
```



Make sure the database device check box is ticked. This will change the VFORM command in the part program (see below).


Vendor Output Format
Label
vf_db
Nominal
Actual
Deviation
Error
Graphic
All the above
Form plot
Errors only
Features in error only
Database device
DME plot
Profile percent values
Use tolerance labels
OK
Cancel

Example code:

V(0)=VFORM/DME,'DB'

The 'DB' parameter specifies that this VFORM configuration is for creating an inspection database.

From the ‘Datum’ menu, select ‘Save’, to save the current datum to the database. This is required by the back-up process, as it makes the datum available to the database device. Without a valid datum, the database data will not be valid.

From ‘High Level’ select ‘Device’. This will bring up the ‘Input / Output Device’ dialogue box.

In the ‘Input / Output Device’ dialogue box, type in a label and name for the database, including the file extension .bak, and select ‘Backup’.

Double-click in the ‘Backup’ field to display a ‘Device’ dialogue box and type in the path and file name.

GUIDANCE NOTE: In the ‘File’ field, do not add a path. This file will be saved in the same path as the backup path.

Example code:

DID(DB_Device)=DEVICE/STOR,'DB_Device.bak',BACKUP,'C:\Renishaw\Backup\
BU_Database_ Demoblock.bak'

When the part program is run, commands executed before the device command will send data to the inspection database. Commands executed after the device will send data to the database device, until the device is closed.

In the ‘Open Device’ dialogue box, select the device from the drop-down list and select ‘Output’. To create a new database, select ‘New’. This overwrites any data in the device (to append data to the device, select ‘Append’).

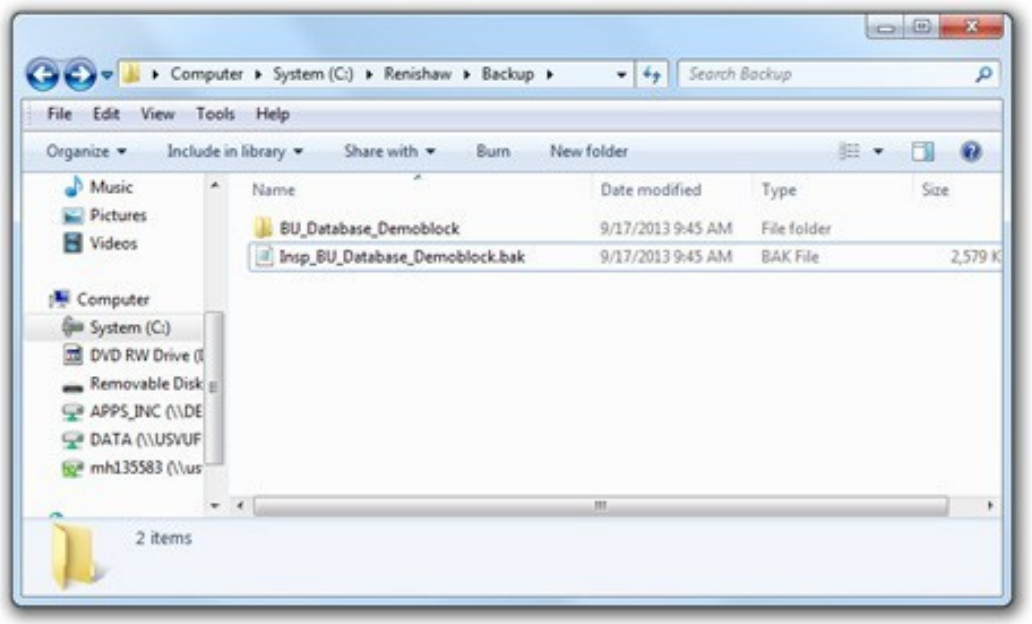
Ensure that ‘User defined’ is checked, select ‘Vendor’, and in the ‘Vendor’ drop-down list select the database vendor configuration that was defined earlier.

It is necessary to recall the correct datum after opening the database device, even if it is already the current datum, since it is required by the dynamic database. Add the inspection commands to the part program that are to be backed up or archived.

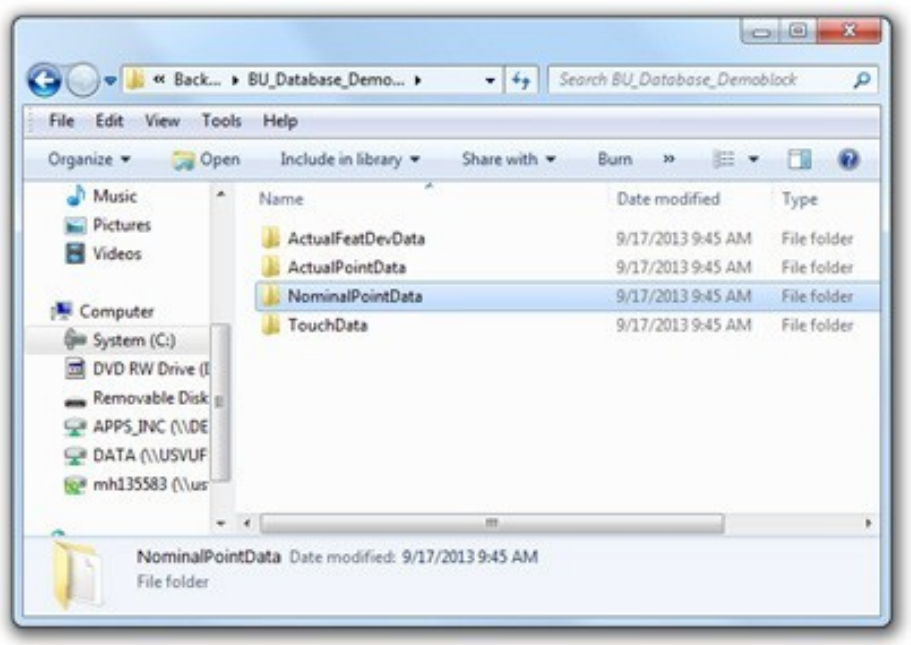
Close the database device, and ensure that ‘Keep’ is selected

Several files are created for the dynamic database. A database file is saved along with another folder with the same name, except that the database file has a prefix of ‘Insp_’.

GUIDANCE NOTE: When referencing this database later, leave out the word ‘Insp_’.



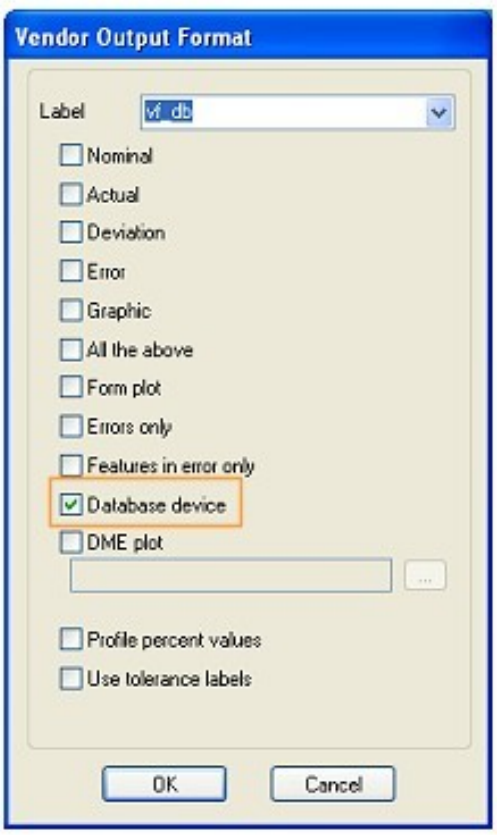
Open the folder and notice that it contains the information from the database, such as actual feature data.



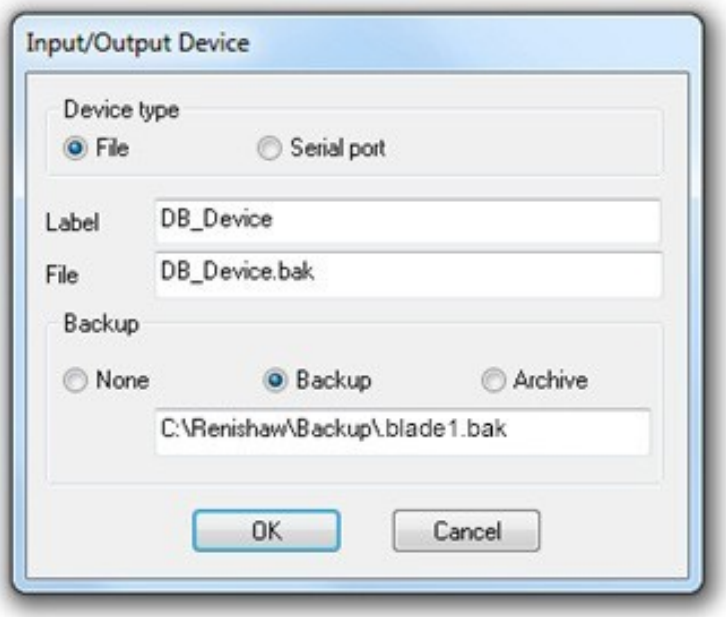
GUIDANCE NOTE: This data is not available in a text format and is not readable without MODUS.

6 Recalling dynamic database data

The following is an example of how to restore and view the data that is contained in a dynamic database. Create a new program in MODUS. Create a ‘Vendor format’ for a



Create a device, specifying the file name and database backup path and name. This should be the same as the original device. It specifies the backup path and name (e.g. C:\Renishaw\ Programs\backup_of_ blade1.bak) and the file it contains (e.g. blade1.bak).

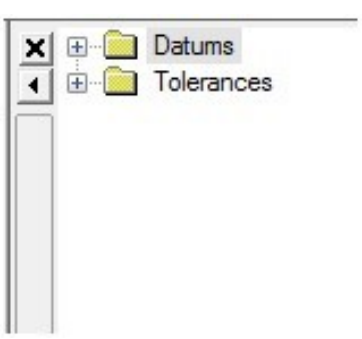

Input/Output Device
Device type
File
Serial port
Label
DB_Device
File
DB_Device.bak
Backup
None
Backup
Archive
C:\Renishaw\Backup\.blade1.bak
OK
Cancel

Recall the coordinate system in which the data was measured. If this is not done, tolerance output will not work.

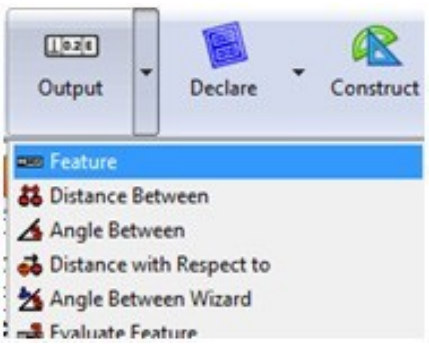
Example code:

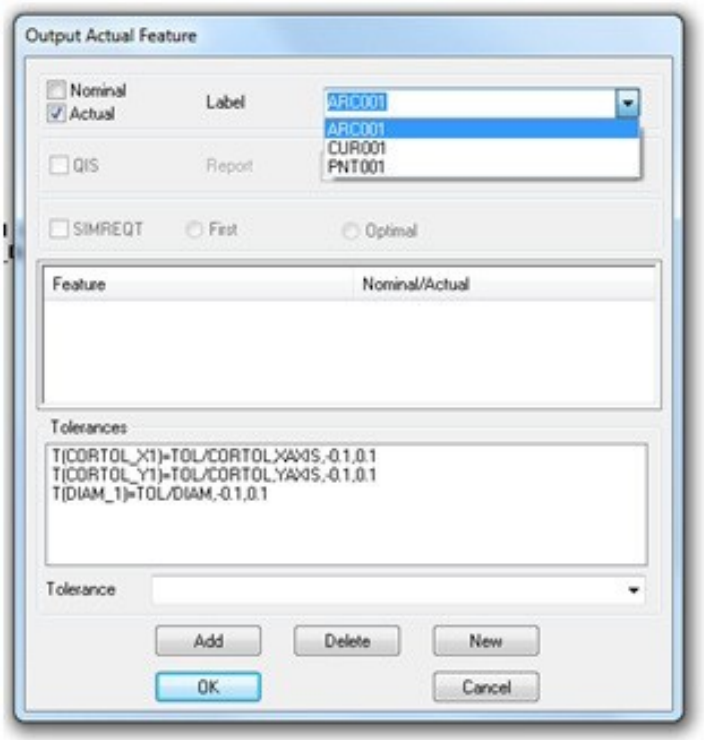
RECALL/DA(DemoBlock)

Even with the device open, there will still not be any feature data showing in the Explorer window. This does not mean that the data is unavailable. It is now in memory and can be referenced in output and construction commands for example.



To illustrate this, output the same tolerance data that was done in the previous program.





GUIDANCE NOTE: This must be done from the ‘Output’ menu item rather than from the ‘Explorer’ window, since the feature data does not show up in ‘Explorer’.

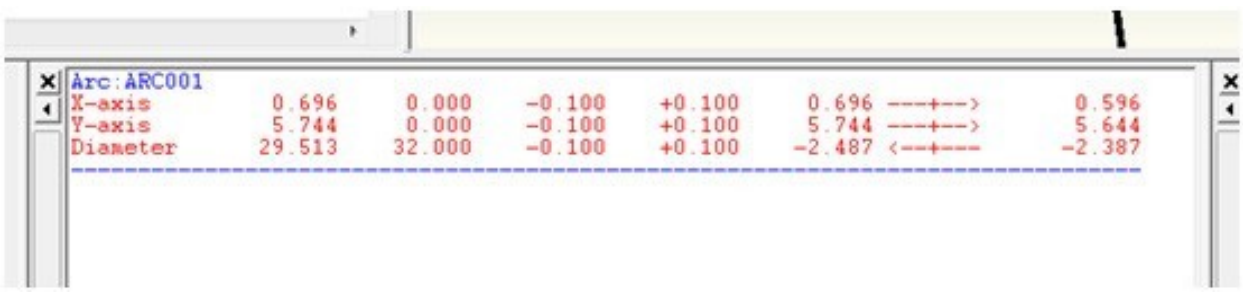
The output can be compared to the results file from the initial run. Compare the data to make sure the data is correct. If not, the datum may be different than the original.

Original data from results file:

```
-------------------------------------------------------------------------------
17-Sep-2013 09:07              Start Template                        Page  1
-------------------------------------------------------------------------------
(mm)          ACTUAL    NOMINAL     LO-TOL     HI-TOL DEVIATION GRAPHIC       ERROR
-------------------------------------------------------------------------------

-------------------------------------------------------------------------------
Arc:ARC001
X-axis         0.696      0.000     -0.100     +0.100     0.696 ---+-->       0.596
Y-axis         5.744      0.000     -0.100     +0.100     5.744 ---+-->       5.644
Diameter      29.513     32.000     -0.100     +0.100    -2.487 <--+---      -2.387
-------------------------------------------------------------------------------
```

New data recalled from the database:



There are many ways to save and use data from a database. The simplest way is to use the local database that MODUS creates, but a more flexible way is to use a dynamic database. This file can be saved to a network location and used later after the part is no longer available to measure, in order to add additional output data to the results file.

This tutorial showed a few ways to do this, but there are many other ways that a dynamic database can be used to store and recall information from parts measured in the past.

This page intentionally left blank

Renishaw plc
New Mills, Wotton-under-Edge, Gloucestershire, GL12 8JR United Kingdom

T +44 (0)1453 524524
F +44 (0)1453 524901
E uk@renishaw.com
www.renishaw.com

For worldwide contact details, please visit our main web site at www.renishaw.com/contact

H-1000-5338-01